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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,112	11/26/2003	Christopher S. Campbell	ARC920030088US1	1350

7590 10/19/2006
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EXAMINER	
COLAN, GIOVANNA B	
ART UNIT	PAPER NUMBER
2162	

DATE MAILED: 10/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/723,112	Applicant(s) CAMPBELL ET AL.	
	Examiner Giovanna Colan	Art Unit 2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is issued in response to the Amendment filed on 08/19/2006.
2. Claims 1, 20, and 39 were amended. No claims were canceled. No claims were added.
3. This action is made Final.
4. Claims 1 –57 are pending in this application.
5. Applicant's arguments filed on 08/19/2006 have been fully considered but they are not persuasive.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1 – 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Palmer et al. (Palmer hereinafter) (US Patent No. 6,990,628 B1, filed: June 14, 1999) as in view of Woo (US Patent No. 7,039,641 B2, filed: February 22, 2001).

Regarding Claims 1, 20, and 39, Palmer discloses a program storage device readable by computer, tangibly embodying a program of instructions executable by said computer to perform a program storage device of extracting information, said program storage device comprising:

inputting a query (Col. 7, lines 30 – 32, Palmer);

searching a database of documents based on said query (Col. 7, lines 28 – 32, Palmer);

retrieving documents from said database based solely on whether said documents are relevant to said query (Col. 4, lines 14 – 19; ... the confidence value or score characterizes the relevance of a particular document to a given query ... documents would be placed in a result set and displaced to a user according to their confidence value or score ... ; Palmer) using a plurality of classifiers (Col. 3, lines 1 – 3, Palmer).

Palmer discloses all the limitations as disclosed above. However, Palmer is silent with respect to a hierarchical cascade of classifier layers. On the other hand, Woo discloses classifiers arranged in a hierarchical cascade of classifier layers (Fig. 1, item

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20, Col. 17, lines 44 – 49, Woo¹). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Woo' teachings to the system of Palmer. Skilled artisan would have been motivated to do so, as suggested by Woo (Col.1 and 2, lines 66 – 67 and 1 – 2; respectively, Woo), to provide a relatively efficient method and system for finding or identifying an applicable filter when a relatively large number of filters are employed in a packet classification system. In addition, both of the references (Palmer and Woo) teach features that are directed to analogous art and they are directed to the same field of endeavor of database management system, such as, searching, classifying data, weights, and frequencies. This relation between both of the references highly suggests an expectation of success.

The combination of Palmer in view of Woo ("Palmer/Woo" hereinafter) further discloses classifiers (Col. 14, lines 23 – 26, categorization within the training set, Palmer; and Fig. 1, item 20, Col. 17, lines 44 – 49, Woo²) including weighted training data points (Col. 13, lines 62 – 66, Palmer³) comprising feature vectors representing any portion of a document (Col. 14, lines 31 – 35, Palmer), wherein each said feature vector is arranged only as a vector of counts for all features in a data point (Col. 14, lines 31 – 35; each component of the feature vector is the normalized value of the **occurrence frequency or a particular feature** in this document, Palmer); and weighing an output from said cascade according to a rate of success of query terms being matched by each layer of said cascade, wherein said weighing is performed

¹ Wherein the filters correspond to the classifiers claimed.

² Wherein the filters correspond to the classifiers claimed.

³ Wherein the training set corresponds to the weighted training data points claimed.

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using a terminal classifier (Col. 16, lines 1 – 11, Palmer⁴; and Col. 5, lines 54 – 61, Woo⁵).

Regarding Claims 2, 21, and 40, Palmer/Woo discloses a program storage device, wherein each classifier accepts an input distribution of data points (Col. 5, lines 41 – 45, input k-tuple t , Woo) and transforms said input distribution to an output distribution of said data points (Fig. 8, item 72, Col. 5 and 15, lines 41 – 45 and 20 – 21, returns the first F_i and output stage; respectively, Woo).

Regarding Claims 3, 22, and 41, Palmer/Woo discloses a program storage device, wherein each classifier is trained by weighing training data points at each classifier layer in said cascade by an output distribution generated by each previous classifier layer (Fig. 8, item 72, Col. 5 and 15, lines 41 – 45 and 20 – 21, returns the first F_i and output stage; respectively, Woo), and wherein weights of said training data points of said first classifier layer are uniform (Col. 5, lines 54 – 57, Woo).

Regarding Claims 4, 23, and 42, Palmer/Woo discloses a program storage device, wherein each classifier is trained according to said query input (Col. 11, lines 46 – 48, Woo⁶).

⁴ Wherein examiner interprets the confidence score as the rate of success claimed; and the β category as the terminal classifier claimed.

⁵ Wherein examiner interprets $prob(F_i \text{ is the best matching filter for } t)$ as the rate of success claimed.

⁶ Wherein examiner interprets the step of matching the filters to the input packet as the step where each classifier is trained according to the query input claimed. Wherein the input bit (further disclosed as "selection criteria" in Col. 11, lines 53 – 55, Woo) corresponds to the query input claimed.

Regarding Claims 5, 24, and 43, Palmer/Woo discloses a program storage device, wherein said query input is based on a minimum number of example documents (Col. 13, lines 62 – 67, small set of electronic documents, Woo).

Regarding Claims 6, 25, and 44, Palmer/Woo discloses a program storage device, wherein said document comprises data points comprising feature vectors representing any portion of said document (Col. 14, lines 31 – 35, Palmer; and Col. 14, lines 31 – 35, feature vectors, Woo).

Regarding Claims 7, 26, and 45, Palmer/Woo discloses a program storage device, wherein said documents comprise a file format capable of being represented by said feature vectors (Col. 14, lines 31 – 35, Palmer⁷).

Regarding Claims 8, 27, and 46, Palmer/Woo discloses a program storage device, wherein said documents comprise any of text files, images, web pages, video files, and audio files (Col. 3, lines 57 – 62, Palmer).

Regarding Claims 9, 28, and 47, Palmer/Woo discloses a program storage device, wherein a classifier at each layer in said hierarchical cascade is trained for each layer with an expectation maximization methodology that maximizes a likelihood of a

joint distribution of said training data points and latent variables (Col. 9, lines 16 – 21, minimize duplication and maximize “balancedness”, Woo⁸).

Regarding Claims 10, 29, and 48, Palmer/Woo discloses a program storage device, wherein each layer of said cascade of classifiers is trained in succession from a previous layer by said expectation maximization methodology, wherein said output distribution is used as an input distribution for a succeeding layer (Fig. 8, item 68a, 70a, 68b, 70b, Col. 15, lines 15 – 19, Woo).

Regarding Claims 11, 30, and 49, Palmer/Woo discloses a program storage device, wherein each layer of said cascade of classifiers is trained by successive iterations of said expectation maximization methodology until a convergence of parameter values associated with said output distribution of each layer occurs in succession (Fig. 4, item 406 and 410, Col. 16, lines 51 – 55, Palmer⁹).

Regarding Claims 12, 31, and 50, Palmer/Woo discloses a program storage device, wherein said successive iterations comprise a fixed number of iterations (Fig. 4, item 406 and 410, Col. 16, lines 51 – 55, Palmer¹⁰).

⁷ Examiner interprets that if feature vectors can be constructed for each document, then it is implied that the format of these documents/or files can be represented in such feature vectors.

⁸ Wherein the distribution of input traffic corresponds to the join distribution claimed.

⁹ Wherein the pre-determined maximum corresponds to convergence parameter of values claimed.

¹⁰ The iterations, that include a pre-determined number used for testing, imply a fixed number of iterations as claimed.

Regarding Claims 13, 32, and 51, Palmer/Woo discloses a program storage device, wherein all layers of said cascade of classifiers are trained by successive iterations of said expectation maximization methodology until a convergence of parameter values associated with output distributions of all layers occurs (Fig. 4, item 406 and 410, Col. 16, lines 51 – 55, Palmer¹¹), wherein during each step of the of said iterations, the output distribution of each layer is used to weigh the input distribution of a succeeding layer (Col. 16, lines 59 – 62, Palmer¹²; and Fig. 8, item 68a, 70a, 68b, 70b, Col. 15, lines 15 – 19, Woo).

Regarding Claims 14, 33, and 52, Palmer/Woo discloses a program storage device, wherein said successive iterations comprise a fixed number of iterations (Fig. 4, item 406 and 410, Col. 16, lines 51 – 55, Palmer¹³).

Regarding Claims 15, 35, and 53, Palmer/Woo discloses a program storage device, wherein each classifier layer generates a relevancy score associated with each a data point, wherein said relevancy score comprises an indication of how closely matched said data point is to said example documents (Col. 4, lines 11 – 16, Palmer).

Regarding Claims 16, 37, and 54, Palmer/Woo discloses a program storage device, wherein each classifier layer generates a relevancy score associated with said

¹¹ Wherein the pre-determined maximum corresponds to convergence parameter of values claimed.

¹² Wherein the current value of $x(j, k)$ corresponds to the output distribution claimed; and the buffer $x'(k)$ corresponds to the input distribution claimed.

document, wherein said relevancy score is calculated from relevancy scores of individual data points within said document (Col. 4, lines 14 – 16, confidence value or score characterizes the relevance of a particular document to a given query, Palmer).

Regarding Claims 17, 36, and 55, Palmer/Woo discloses a program storage device, wherein said terminal classifier generates a relevancy score associated with each data point, wherein said relevancy score comprises an indication of how closely matched said data point is to said example documents (Col. 4, lines 11 – 16, Palmer), and wherein said relevancy score is computed by combining relevancy scores generated by classifiers at each layer of the cascade (Col. 12, lines 22 – 28, Palmer).

Regarding Claims 18, 34, and 56, Palmer/Woo discloses a program storage device, wherein said terminal classifier generates a relevancy score associated with a document, wherein said relevancy score is calculated from relevancy scores of individual data points within said document (Col. 4, lines 14 – 16, Palmer).

Regarding Claims 19, 38, and 57, Palmer/Woo discloses a program storage device, wherein features of said feature vectors comprise words within a range of words located proximate to entities of interest in said document (Col. 14, lines 29 – 35, Palmer¹⁴).

¹³ The iterations, that include a pre-determined number used for testing, imply a fixed number of iterations as claimed.

¹⁴ Wherein examiner interprets one-half million word phrases out of two million features corresponds to the words within a range claimed.

Response to Arguments

1. Applicant cannot show non-obviousness by attacking references individually where, as here, the rejections are based on a combination of references.

In re Keller, 208 USPQ 871 (CCPA 1981).

2. Applicant argues that the prior art fails to disclose; "does not take into account the user query".

Examiner respectfully disagrees. The claim language does not disclose the specific limitation of "taking into account" the user query. On the other hand, the cited prior art does disclose the newly added limitation including: based solely on whether said documents are relevant to said query (Col. 4, lines 14 – 19; ... the confidence value or score characterizes the relevance of a particular document to a given query ... documents would be placed in a result set and displaced to a user according to their confidence value or score ... ; Palmer).

3. Applicant argues that the prior art fails to disclose; "input distribution" and "output distribution".

Examiner respectfully disagrees. As stated in office action dated 05/05/2006, the combination of Palmer in view of Woo does disclose input distribution and output distribution (See rejection of claims 2, 21, and 40 in this office action above). Further, applicant argues that the cited prior art does not refer to "input distribution" and "output

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distribution" as an assignment of probabilities to all possible such tuples. The combination of Palmer in view of Woo does disclose such limitation (Col. 5, lines 37 – 44; k-tuples $(t_1, \dots, t_k) \dots F$ a k-dimensional filter denoted by $(f_1, \dots, f_k) \dots$ table FT of size N denoted by F_1, \dots, F_N, \dots input tuples k-tuples t and returns the first $F_i \dots$; Woo).

4. Applicant argues that the prior art fails to disclose; "an expectation maximization methodology that maximizes a likelihood of a joint distribution of said training data points and latent variables".

Examiner respectfully disagrees. The combination of Palmer in view of Woo does disclose an expectation maximization methodology that maximizes a likelihood of a joint distribution of said training data points and latent variables (Col. 9, lines 16 – 21, minimize duplication and maximize "balancedness", Woo). Wherein the distribution of input traffic corresponds to the join distribution claimed.

Further, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (expectation maximization **algorithm**) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The limitation including "expectation maximization algorithm", as stated by applicant's arguments, is not disclosed by the claim language.

5. Applicant argues that the prior art fails to disclose; "the concept of collection".

Examiner respectfully disagrees. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies ("**the concept of collection**") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The limitation including "the concept of collection", as stated by applicant's arguments, is not disclosed by the claim language.

6. Applicant argues that the prior art fails to disclose; "probability vector at each layer to form and overall probability vector that can be used to make final classification".

Examiner respectfully disagrees. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (probability vector at each layer to form and overall probability vector that can be used to make final classification) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The embodiments, such as, "a probability vector", "an overall vector", and "final classification" are not disclosed by the claim language. It is further notice that the embodiment "overall probability vector" is not disclosed in the specification of this patent application.

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7. Applicant argues that the office action fails to disclose *prima facie* case of obviousness.

Examiner respectfully disagrees. According to MPEP § 2142, to establish *prima facie* case of obviousness three basic criteria must be met. **First**, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. The prior art discloses a suggestion for combining the references (Col. 1, and 2, lines 63 – 67, and 1 – 2; respectively, Woo).

As suggested by Woo, skilled artisan would have been motivated to make such combination, to classify packets using relatively large number of filters and to provide a relatively efficient method and system for finding or identifying an applicable filter when a relatively large number of filters are employed in a packet classification system.

Second, there must be a reasonable expectation of success. The prior art suggests a successful outcome of this combination, such as, an efficient method and system for finding or identifying an applicable filter. **Third**, both of the references (Palmer and Woo) teach features that are directed to the same industry field, such as, searching, classifying data, weights, and frequencies. This close relation between both of the references highly suggests an expectation of success. Therefore, the combination of Palmer in view of Woo discloses all the claim limitations disclosed in the claimed invention (see- citations of claims 1 – 57 above).

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8. Applicant argues that; "the reason given to support the proposed combination is improper".

Examiner respectfully disagrees. The reason given to support the proposed combination is proper (See response to argument 6 in this office action above).

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Prior Art Made Of Record

1. Palmer et al. (US Patent No. 6,990,628 B1, filed: June 14, 1999) discloses a method and apparatus for measuring similarity among electronic documents.
2. Woo (US Patent No. 7,039,641 B2, filed: February 22, 2001) discloses modular packet classification.
3. Itzhak et al. (US Patent App. Pub. No. 2004/0181525 A1) discloses a system and method for automated mapping of keywords and key phrases to documents.
4. Swaminathan et al. (US Patent App. Pub. No. 2004/0267729 A1) discloses a knowledge management tool.
5. Appelt et al. (US Patent No. 6,601,026 B2) discloses an information retrieval by natural language querying.

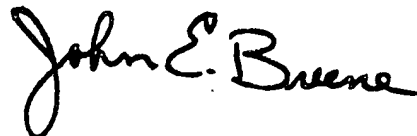
Points Of Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Giovanna Colan whose telephone number is (571) 272-2752. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Giovanna Colan
Examiner
Art Unit 2162
October 12, 2006



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